

Abstract of the Disclosure

An apparatus and a method for performing a chemical vapor deposition process that reduces particle contamination of a wafer, wherein a cleaning gas including a fluorine radical is introduced into the process chamber to clean the chamber. After loading a wafer in the process chamber, a deposition gas is introduced into the chamber to form a film on the wafer. An inert gas as a back flow-preventing gas is introduced into the process chamber through a cleaning gas supply line to prevent the deposition gas from flowing back toward the cleaning gas supply line. Thus, the cleaning gas supply line is prevented from being contaminated by the deposition gas and particle formation on the wafer during deposition of the film is reduced, so that yield and reliability of the semiconductor device may be improved.